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EXTRACTED VERSION

AD A995167

LITTLE FELLER I

Test Group Director's Concept

Field Command, Defense Atomic Support Agency
Mercury, Nevada

18 June 1962

NOTICE

This is an extract of LITTLE FELLER I,
Test Group Director's Concept, which
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Extract version prepared for:

Director
DEFENSE NUCLEAR AGENCY
Washington, D.C. 20305

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

LITTLE FELLER I
height of burst
crater characteristics
fallout
seismic
Dynamic pressure effects
Air blast

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

LITTLE FELLER I is part of a larger scientific program to get a better understanding of the effects obtained from fractional yield weapons. Previous data from similar devices are suspect because of the conditions under which they were detonated. Blast, cratering, radiation and fallout measurements have not been made for expected conditions of use. LITTLE FELLER I is a shot to obtain necessary data which the U.S. Army will use in its planning for effective and safe use of weapons of similar yield and configuration. It is also a shot which is designed to test equipment, tactics and techniques for use of the Davy Crockett weapon system in ground combat.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

FOREWORD

This report has had classified material removed in order to make the information available on an unclassified, open publication basis, to any interested parties. This effort to declassify this report has been accomplished specifically to support the Department of Defense Nuclear Test Personnel Review (NTPR) Program. The objective is to facilitate studies of the low levels of radiation received by some individuals during the atmospheric nuclear test program by making as much information as possible available to all interested parties.

The material which has been deleted is all currently classified as Restricted Data or Formerly Restricted Data under the provision of the Atomic Energy Act of 1954, (as amended) or is National Security Information.

This report has been reproduced directly from available copies of the original material. The locations from which material has been deleted is generally obvious by the spacings and "holes" in the text. Thus the context of the material deleted is identified to assist the reader in the determination of whether the deleted information is germane to his study.

It is the belief of the individuals who have participated in preparing this report by deleting the classified material and of the Defense Nuclear Agency that the report accurately portrays the contents of the original and that the deleted material is of little or no significance to studies into the amounts or types of radiation received by any individuals during the atmospheric nuclear test program.

CONTINENTAL TEST ORGANIZATION
FIELD COMMAND DEFENSE ATOMIC SUPPORT AGENCY
Post Office Box 207, Mercury, Nevada

16 June 1962

PROJECT NUMBER	TITLE	AGENCY	PROJECT OFFICER, LOCATION & TEL NO	PARTICIPATION LF I	PARTICIPATION LF II
1.1	Air Blast	BRL	Mr. J. J. Meszaros Q-20, 9698	X	X
1.3	Dynamic Pressure Effects	BRL	Mr. N. H. Ethridge Q-20, 9698	X	X
1.5	Debris Throwout	ERDL	SP5 P. Morris Q-16, 8-2679		X
1.9	Crater Dimensions	WES	Mr. A.D. Rooke Q-4, 9633		X
2.3	Neutron Measurements	NDL	Mr. D. Rigotti Q-16, 9680	X	X
2.4	Gamma Measurements	NDL	Mr. D. Rigotti Q-16, 9680	X	X
2.8	Radiological Survey	NDL	Mr. E. Bouton Q-4, 9633	X	X
2.16	Residual Radiation in the Crater	ERDL	SP5 P.Morris Q-16, 8-2679		X
2.17	Transient Radiation Effects on Electronics	NC	Mr. W. B. Bowen Tlr 2A, 9695		X
2.19	Induced Activity	NRDL	Mr. J. M. Ferguson Q-14, 9221	X	
2.20	Gamma Transitory Dose	NDL	Mr. M. Schumchyk Q-11, 9692	X	X
9.2	Documentary Photography	FCDASA	Maj G. N. Reinhardt Q-7, 9687	X	X
9.3	Technical Photography	EG&G	Mr.L. Donovan CP-1, 8-2577	X	X
9.4	Weapon Test Reports	FCDASA	Lt Col H. Heaton Q-36, 9658	X	X
9.5	Communications	FCDASA	Capt Aschettino Q-32, 9637	X	X

9.6	General DOD Support	FCDASA	Lt Col G. E. Greene Q-36, 9658	X	X
9.7	Engineering and Field Operations	H&N/FC	Maj A. J. Rabogliatti Q-34, 9252	X	X
45.1a	Timing and Firing	EG&G	Mr. B. Murphy CP-1, 8-2343	X(1)	X
45.1b	Ehangmeter Measurements	EG&G	Mr. E. L. Jenkins	X	X
45.5a	Assembly and Emplacement	SC	Mr. I. B. Hamilton	X(2)	X
45.5b	Device Arming	SC	Mr. J. Johnson CP-1, 8-2401	X(2)	X
45.5c	Fireball and Shock Photography	EG&G	Mr. L. Donovan CP-1, 8-2577	X	X
45.6	Rad-Chem Analysis	LASL	Mr. R. Campbell CP-1, 8-2451	X	X
	Engineering & Construction	SC	Mr. J. R. Heaston Tlr 102F, 9313	X	X

(1) - Delete "Firing", if Army has this responsibility
(2) - Omit function, if Army has these responsibilities

ERL - Ballistic Research Laboratory
ERDL - USA Engineer Research and Development Laboratories
WES - USA Engineer Waterways Experiment Station
NDL - USA Chemical Corps Nuclear Defense Laboratory
NC - Northrop Corporation, Ventura Division
NRDL - US Naval Radiological Defense Laboratory
H&N - Holmes and Narver, Inc
SC - Sandia Corporation
LASL - Los Alamos Scientific Laboratory

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1. PURPOSE. LITTLE FELLER I is part of a larger scientific program to get a better understanding of the effects obtained from fractional yield weapons. Previous data from similar devices are suspect because of the conditions under which they were detonated. Blast, cratering, radiation and fallout measurements have not been made for expected conditions of use. LITTLE FELLER I is a shot to obtain necessary data which the U. S. Army will use in its planning for effective and safe use of weapons of similar yield and configuration. It is also a shot which is designed to test equipment, tactics and techniques for use of the Davy Crockett weapon system in ground combat.

2. SITE SELECTION AND DESCRIPTION.

a. The location selected for LITTLE FELLER I is in Area 18 at Nevada State Coordinates N 859,076.12 - E 601,880.48. It is on a ridge which is about a mile long and in general slopes gently on its axis toward the south. The topography toward the flanks is rolling in character. Toward the north the ridge reaches a summit which provides an excellent view in all directions, especially northward to higher lands at a distance of a few miles. The summit is about 200 feet above the general elevation in the area.

b. Ground zero has been chosen to lie on the crest of the ridge about 3000 feet south of the summit. Its elevation is approximately 100 feet above the general elevation.

c. The ridge is composed of unconsolidated alluvial materials which are presently being eroded. It has withstood erosion as compared with the nearby valleys because of a greater resistance, probably caused by the size, shape, kind and compaction of its components. The surface near the location which has been selected for ground zero is composed of materials that range from clay, through sand and gravel to cobble size, the finer sizes being predominant.

d. This site provides an opportunity to obtain technical data and at the same time it is an excellent location for a military exercise, culminating in an attack from the south.

3. DESCRIPTION OF DETONATION.

a. Emplacement and Yield. FCNT 62/0800 D

(1) Two plans have been proposed for firing the weapon in LITTLE FELLER I.

(a) LITTLE FELLER I will consist of [redacted]. It will be fuzed, aimed, and fired to burst at a height of 40' from the surface and over GZ. Present experience shows that 50% of shots fired under similar conditions will burst within a height of 20 to 40 feet and within an ellipse having

a long axis of 30 meters (in direction of fire) and a short axis of 10 meters at the aiming point. Weapon management is a responsibility of the Davy Crockett Tactical Orientation Director.

(b) LITTLE FELLER I will consist of fired statically at a 40 foot height of burst. Device management is a responsibility of the AEC Test Group Director.

(2) When firing plans are firm, an announcement will be made to assign responsibility for weapon management and method of firing.

(3) It is expected that the shot will be fired when winds are in the sector of 175° ± 40° which should be favorable for about 2 days out of three.

b. Effects. Following are the predicted effects of LITTLE FELLER I, based upon the assumption that it will detonate as programmed

(1) Crater Characteristics. The fireball for this shot should be about 20 feet in radius so should reach approximately one-half distance from the programmed WP to the surface. Since cratering is insignificant for a height of burst which is equal to or greater than that at which the fireball just touches the ground, there should be no crater formed by the shot.

(2) Fallout.

(a) At a 40 foot height of burst local fallout from the shot should be minor and cause no problem.

(b) Fallout would be significant if detonation were to occur at a HOB of only a few feet. Predictions for HOB of 3 feet, that programmed for LF II, are provided here to illustrate expected effects if a fuze failure were to result in a low burst.

(c) Fallout pattern for this condition has been estimated on the basis of the VESTA Event and scaling laws. It is expected that particle sizes from a 3 foot HOB will be the same as for a surface detonation. Winds used for this prediction are typical for the summer months at NTS.

(d) The cloud is expected to rise approximately 6000' above the surface and to have a maximum radius of 4000 to 5000 feet.

(e) The following table lists the predicted H+1 intensity and infinite dosages at various distances downwind, 30° wind shear/12 MPH and 15° wind shear/20 MPH. Accuracy is estimated to be within a factor of 2.

Distance (miles)	30° Shear/12 MPH Intensity (R/Hr @ H+1)	30° Shear/12 MPH Infinite Dose (R)	15° Shear/20MPH Intensity (R/Hr @ H+1)	15° Shear/20MPH Infinite Do (R)
1	8	40	25	100
3	2	10	5	25
5	0.7	3.5	2	15
8	0.2	1.0	.9	5.0
10	0.09	.45	.6	2
12	0.05	.25	.35	1.5
15	0.02	.12	.2	1.0
18	0.01	.05	.1	.5
22	0.005	.03	.06	.3

(f) The upwind extent of radiation is estimated to be three-fourths of a mile. The cross wind radiation pattern at zero range is estimated to extend to a radius of approximately 2500 feet. Stronger winds or winds with less shear will increase the dose at all distances, in a narrow pattern, by an amount roughly proportional to the wind speed and inversely proportional to the angular shear.

(g) It is estimated that alpha contamination will exceed 1000 $\mu gm/m^2$ for a radius of 1000 feet from GZ.

(h) The Test Manager's fallout prediction unit will be requested to review fallout predictions and to provide estimates based upon best information available.

(3) Air blast. Predicted overpressures caused by the detonation are shown in the table:

Overpressure (psi)	Distance from GZ (feet)
100	95
10	275
1	1100
0.5	1700
0.1	8200

(4) Seismic. Expected seismic acceleration caused by the explosion is shown below:

Acceleration (G)	Distance (feet)
1	225
0.1	720

(5) Thermal. Predictions for thermal energy (or radiant exposure) are as follows:

Slant Distance (miles)	Cal/cm^2
100 (ft)	55
425 (ft)	3
0.1	2
0.2	0.5
0.3	0.24
0.5	0.08
1.0	0.02
2.0	0.005

It is possible that fires will be started out to a distance of about 400 feet.

4. ORGANIZATION.

a. LITTLE FELLER I will be administered by the NTS Organization, as published in the Standing Operating Procedure for NTS.

b. Mr. A. J. Max has been appointed by the Nevada Operations Office, AEC, to manage functions which fall within the purview of the AEC.

c. Lt Col Benjamin Grote has been assigned as the Test Group Director from Field Command, Defense Atomic Support Agency, and will be responsible for accomplishing the various technical measurements described herein. His responsibilities will also include the procurement, emplacement, arming and firing of the nuclear device. Attachments 1 to 3 are charts for the Nevada Test Site Organization, Continental Test Organization, and LITTLE FELLER I Organization.

5. TECHNICAL PROJECTS OF DOD. Following are technical projects for which the DOD will have responsibility:

a. Project 1.1, Air Blast (BRL).

(1) Objectives.

(a) To measure the air blast phenomena resulting from near-surface sub-kiloton nuclear detonations.

(b) To integrate the results with existing data from sub-kiloton nuclear and HE shots.

(c) To provide supporting free-field measurements of blast parameters to other projects as required.

(2) Experimental Technique. Approximately twelve measuring stations will be established, covering a range of 1000 to 0.01 psi overpressure along a blast line extending radially from ground zero. Dynamic pressure (six stations) and surface level overpressure versus time measurements will be made.

(3) Project agency is Ballistic Research Laboratories, Aberdeen Proving Ground, Maryland.

b. Project 1.3, Dynamic Pressure Effects (BRL).

(1) Objectives.

(a) To perform basic response studies of simple cubical and spherical shapes and of military equipment.

(b) To relate the effects produced on the equipment to the incident blast wave characteristics.

(c) To determine the protective value of revetments of special design and/or natural terrain features.

(d) To determine damage versus distance from low yield nuclear explosions for military equipment such as 1/4 ton trucks and tanks.

(2) Experimental Technique.

(a) Vehicles will be placed in open and protected positions. Overpressure-time and dynamic-time measurements will be made. Damage will be assessed and correlated with pressures.

(b) Model studies will be made (small cubes, spheres, tanks).

(c) Neutron and gamma radiation studies will be made within positioned tanks.

(d) Shock tube studies will be made.

(3) Project agency is Ballistic Research Laboratories, Aberdeen Proving Ground, Maryland.

c. Project 2.3, Neutron Measurements (NDL).

(1) Objectives.

(a) To measure the neutron flux, dose, and spectrum as a function of distance from ground zero giving particular emphasis to very high overpressure areas and determination of significance of asymmetry of radiation.

(b) To perform neutron measurements in support of other DOD agencies.

(2) Experimental Technique. Threshold detectors, placed at various distances along 3 azimuths from ground zero and attached to 1" wire cables will be used to measure neutron flux. Immediately after detonation, detectors will be pulled from the radiation area.

(3) Project agency is U. S. Army Chemical Corps Nuclear Defense Laboratory, Army Chemical Center, Maryland.

d. Project 2.4, Gamma Measurements (NDL).

(1) Objective. To measure gamma radiation dose as a function of distance and to determine the significance of transient radiation from passage of the cloud.

(2) Experimental Technique.

(a) In order to obtain total gamma dose with distance the following detectors will be used: film, glass micro-dosimeters, cobalt glass plates, amino acids, thermo-luminescent, and formic acid chemical dosimeters. These detectors should cover a gamma range up to 10^8 rads. The amino acid dosimeters work on the principle of the formation of free radicals by radiation. These radicals are trapped in the crystal lattice and are read by ESR techniques.

(b) Ground station lines will run from ground zero to the distance where the initial gamma is expected to be about one rad. Detectors will be positioned at ten to 800 yards from GZ. The closer stations will be shielded from blast and thermal radiation. The detector lines will be attached to a cable that will be recovered as soon as possible after H hour.

(3) Project agency is U. S. Army Chemical Corps, Nuclear Defense Laboratory, Army Chemical Center, Maryland.

e. Project 2.8, Radiological Survey (NDL).

(1) Objective. The objectives of this project are to obtain information concerning the magnitude and size of the contaminated area resulting from the detonation of Davy Crockett warheads at operational HOB's and to obtain information for improving fallout prediction techniques for contaminating burst of tactical fractional nuclear weapons.

(2) Experimental Technique. The contaminated area will be thoroughly surveyed to the 0.1 R/hr at H+1 hour dose rate contour by ground survey parties and helicopter-to-ground aerial surveys. Dose rate measurements at regular intervals at fixed points throughout the area will be made to obtain field decay characteristics. Dose-rates inside the crater and at the crater lip at early times will be determined by helicopter-to-ground surveys, placing instruments inside the crater immediately after the shot. At regular intervals up to 2 months after the event, the contaminated area will be surveyed. Total dose data will be collected by placing filter packets at survey positions.

(3) Project agency is U. S. Army Chemical Corps, Nuclear Defense Laboratory, Army Chemical Center, Maryland.

f. Project 2.19, Induced Activity (NRDL).

(1) Objective. To develope and test a militarily useful system for predicting gamma-ray dose rates from radioactivity induced in the soil by neutrons from a low air burst of a tactical nuclear weapon.

(2) Experimental Techniques. The measurements consist of determining the specific radioactivity induced in small samples of elements exposed at various distances and depths, and also of measuring the dose rate in the area of ground zero at times of the order of H plus a few hours. After H hour, the activated samples will be returned to the NRDL mobile laboratory now located in the DOD compound at Mercury, Nevada. The activities of the samples will be determined there using two gamma-ray spectrometers. Dose rate measurements will be made with the NRDL GTIR, Model 103 type dose rate meter. The dose rate meters will be placed in position about one hour after the blast, at the same time the samples are recovered.

(3) Project agency is the U.S. Naval Radiological Defense Laboratory, San Francisco, California.

g. Project 2.20, Gamma Transitory Dose (NDL).

(1) Objective. The objective is to determine the significance of transient radiation due to passage of a cloud from a nuclear detonation.

(2) Experimental Technique. A system of gamma dose rate detectors will be placed in foxholes at several distances downwind from ground zero. The intensity versus time plots will be compared with data collected on the ground at the same locations. An attempt will be made to establish the various radiation sources from airborne activity contributing to the dose rate in a foxhole. Dose rate data on direct penetration into foxholes as well as scattered penetration will be measured. Radiation detector units with ranges of 0-10 r/hr, 0-100 r/hr and 0-1000 r/hr will be used to measure the gamma dose rate. The principal components of the units are the battery packs, high voltage power supply, photomultiplier tube, crystal, meter and recorder. The high voltage power supply provides 1240 volts, regulated, for the photomultiplier tube. Gamma radiation causes the crystal to emit pulses of light which are detected by the photomultiplier tube. The light causes the photomultiplier tube to conduct and this current is measured by the indicating meter and recorder.

(3) Project agency is the U. S. Army Chemical Center, Nuclear Defense Laboratory, Army Chemical Center, Maryland.

h. Project 9.3, Technical Photography (EG&G).

(1) Objective. To provide high speed photographic support for Project 1.3 stations and subsequently to record the travel of objects from these stations through a lateral distance of 20 feet.

(2) Procedures. Two Eastman high speed cameras will be mounted in a specially constructed bunker located 80 feet east of each station. Bunkers must withstand a pressure of 100 psi and a radiation level of 100,000 R.

(3) Project agency is Edgerton, Germeshausen & Grier Inc., Las Vegas, Nevada.

6. SUPPORT PROJECTS OF THE DOD. Following are projects of the DOD which provide support for the technical projects.

a. Project 9.2, Documentary Photography (DOD). This project provides documentary for all projects.

b. Project 9.4, Weapons Test Reports (DOD). This project has general responsibility for surveillance and supervision of the report requirements for each technical project. Field Command's reporting procedures (FCWT Continental Test Operations SOP Number 140-1, 8 May 62) will be followed. Requirement for a pretest report on this test has been withdrawn. Other reports will be consistent with cited SOP. The POIR and POR will be due within 30 days and six months respectively from shot date.

c. Project 9.5, Communications (DOD). Communication services for all functions related specifically to the LITTLE FELLER I program are provided by this project.

d. Project 9.5, General DOD Support (DOD). The title indicates the functions of this project.

e. Project 9.7, Engineering and Construction (DOD). All Engineering and Construction functions for DOD projects will be accomplished through and under the supervision of DOD E&C Branch.

7. PROJECTS OF THE AEC.

a. Project 45.1a, Timing and Firing (EG&G).

(1) Objective. To provide timing and firing signals if decision is made to fire the device statically or to provide timing signals if operational firing is executed. Both dry and live runs are specified.

(2) Procedures. Signals will originate at F.C.P. The zero point and close-in stations will receive signals by hard wire. More distant stations may be served by either radio or hard wire as dictated by field conditions.

(3) Project agency is Edgerton, Germeshausen & Grier Inc., Las Vegas, Nevada.

b. Project 45.1b, Bhangmeter Measurements (EG&G). Two bhangmeters will be installed at the forward control point to provide an indication of the yield within minutes after the detonation.

c. Project 45.1c, Fireball and Shock Photography (EG&G). Fireball pictures will be taken at two different stations which are situated on mutually perpendicular radii. These pictures will provide the primary yield measurement.

d. Project 45.5a, Device Assembly and Emplacement (SC). The device will be assembled at Site Able by Sandia Corporation personnel and shipped to NTS. Any reconditioning which may be required following shipment will be accomplished in Area 16. Emplacement will be by suspension between poles.

e. Project 45.5b, Device Arming (SC). Arming will be accomplished by Sandia Corporation personnel.

f. Project 45.6, Rad-Chem Analyses (LASL). Rad-Chem samples and analysis will be collected and made by the Los Alamos Scientific Laboratory.

g. Engineering and Construction. Engineering and Construction for AEC projects will be the responsibility of the Sandia Corporation.

8. FIELD CONSTRUCTION. Field construction for LITTLE FELLER I will be relatively small. Requirements for DOD projects are suggested in abbreviated form by attachment 4. Those for AEC projects are routine.

9. DAVY CROCKETT TACTICAL ORIENTATION. As a part of the LITTLE FELLER I event there will be a Davy Crockett Tactical Orientation.

a. The general plan of this orientation is to employ the DAVY CROCKETT weapon system in conjunction with conventional support weapons, i.e., 105mm howitzers and 4.2 inch mortar, in support of a mechanized infantry rifle company reinforced by a tank platoon in an attack on a prepared enemy position.

b. In this exercise the Davy Crockett nuclear round will be used in the direct fire role to rupture the forward enemy position, permitting the mechanized rifle company to attack from its prepared defensive position, to secure its assigned objective.

c. The participating troops will be deployed in individual and two man foxholes or in trenches and crew served weapon positions. After H hour, during the tactical damage assessment from the Davy Crockett shot and the conventional preparation, the participating troops will withdraw from their defensive positions to armored personnel carriers located in nearby defilade and prepare to launch the attack to the objective. The time between H hour and time of departure is 15-30 minutes, or as soon as tactical damage assessment is accomplished. However, for this exercise the test director through the established chain of command, will prescribe the time for crossing the line of departure. Radiological monitors will precede the attacking force.

d. Tactical control of this exercise will be executed with normal organic radio and wire nets. Normal tactical control measures (consisting of a line of departure, axis of advance and an objective) are given the assaulting company.

e. Details of the tactical orientation will be published separately.

10. CONTROL POINT. The control point for LF I will be at N 847,500 - E 598,100, Nevada State Coordinates. This will also serve for LF II and JOHNIE BOY.

11. OBSERVER PROGRAM. It is anticipated that about 500 military and civilian observers of high official rank will witness LITTLE FELLER I. The observation area will be near N 847,250 - E 599,500, which is about 1200 feet from the control point for the event. Bleachers will be provided for the observers.

12. NEWS REPORTERS. Admittance of news reporters to the event is under consideration.

13. OPERATIONS.

a. Schedule.

(1) Construction is in progress now and will continue until near shot time.

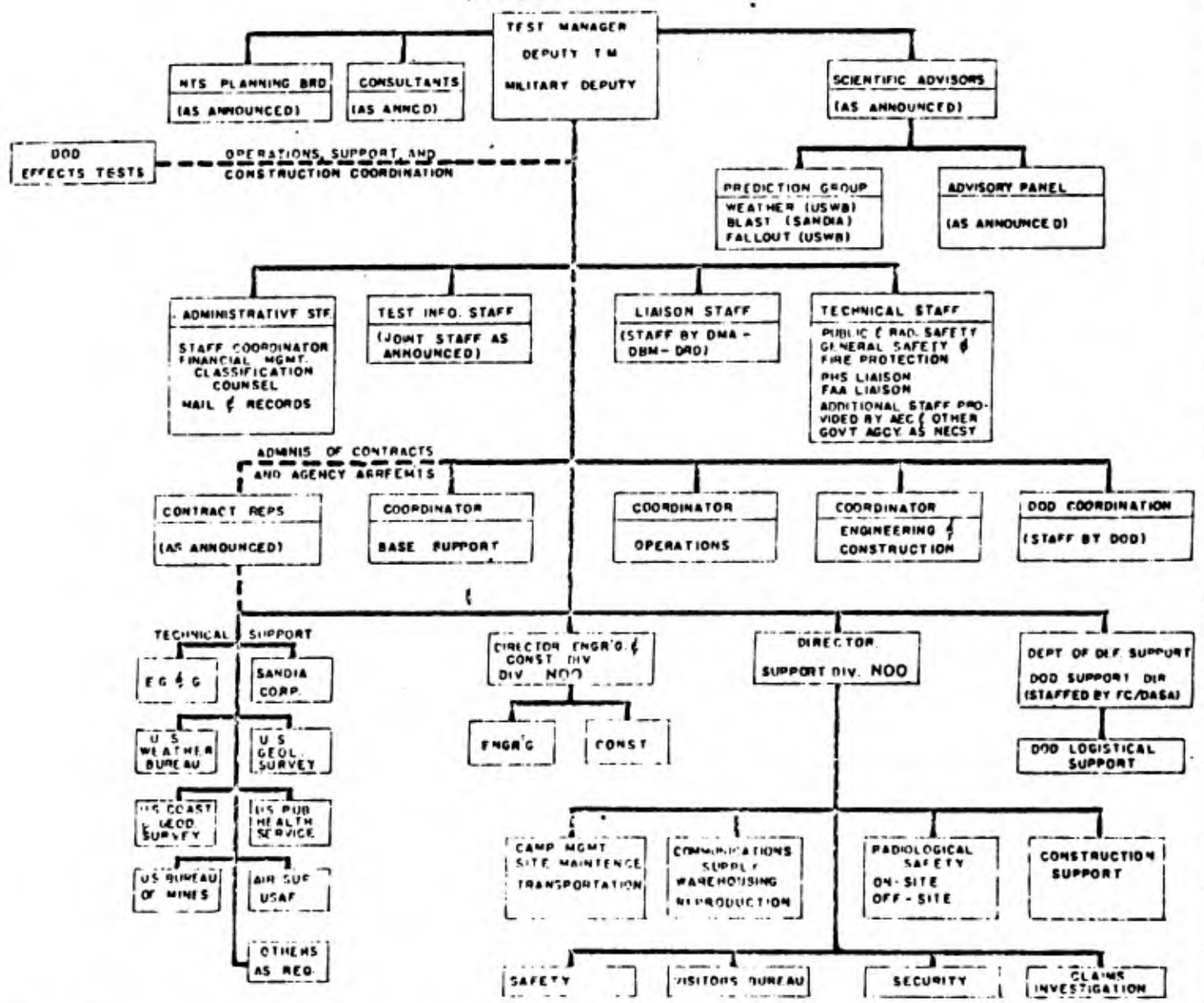
(2) Detonation date: 24 July 1962.

b. Support Requirements. The Technical Director's organization will be responsible for coordinating construction requirements for all agencies participating on Project LF I. Support requirements will be handled by each agency via the normal NTS Standard Operating Procedures.

c. Safety (Including Rad-Safe). On site safety responsibilities will be as set forth in the NTS Standard Operating Procedures and as required by each participating agency. Pre-shot safety regulations within the experimental area as they affect the success of the project will be determined by the Technical Director's safety representative. Post shot safety including Rad-Safe within the experimental area will remain the responsibility of the Technical Director until such time as this responsibility is released to the Project Manager's Organization.

Witness 1

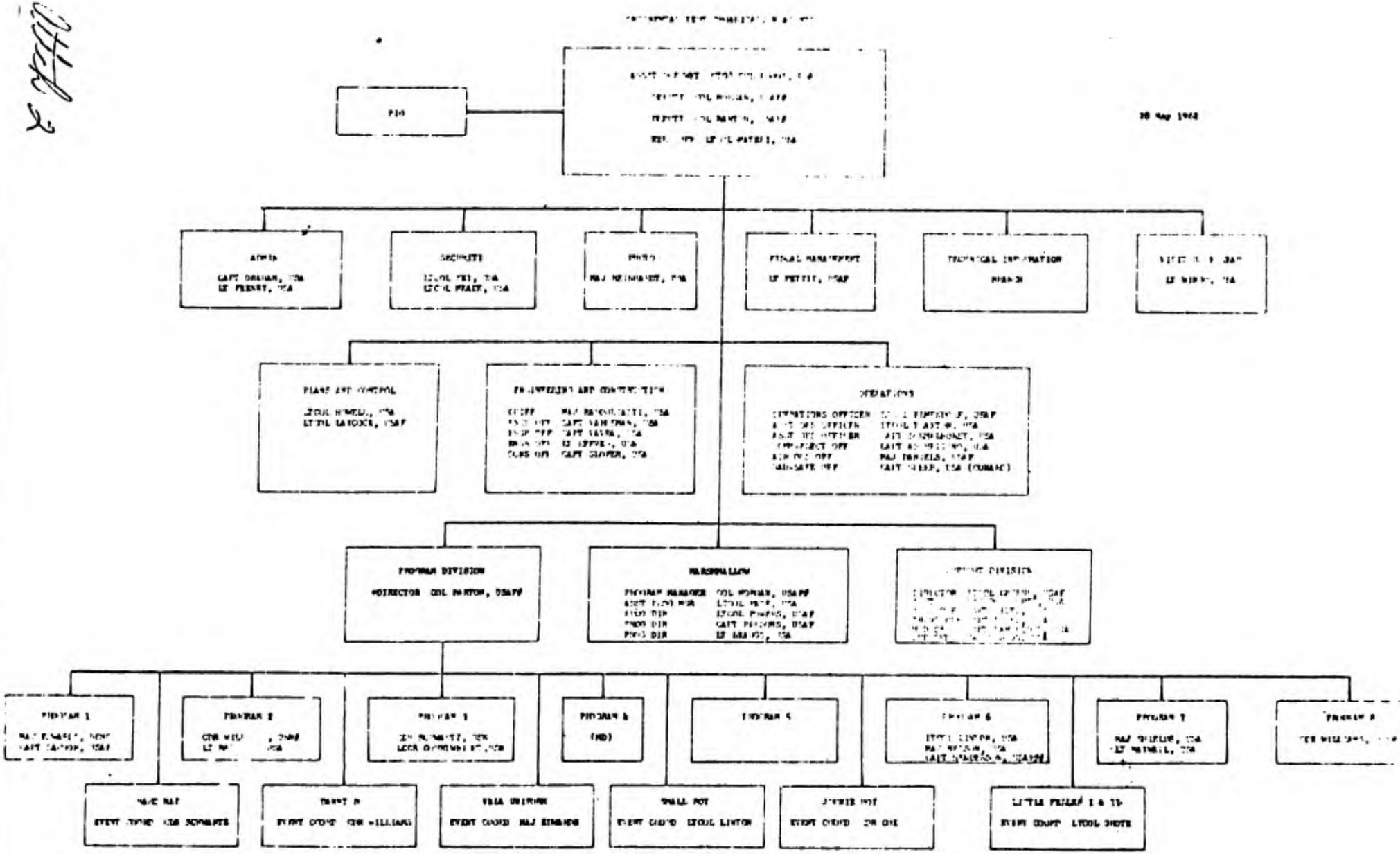
NEVADA TEST SITE ORGANIZATION (NTSO)



Revised Sept. 19, 1961

NEVADA TEST SITE ORGANIZATION

NTSO APPENDIX 0101-01



Final assignments MTS
*MTDY from AFCMD for SMALL POT

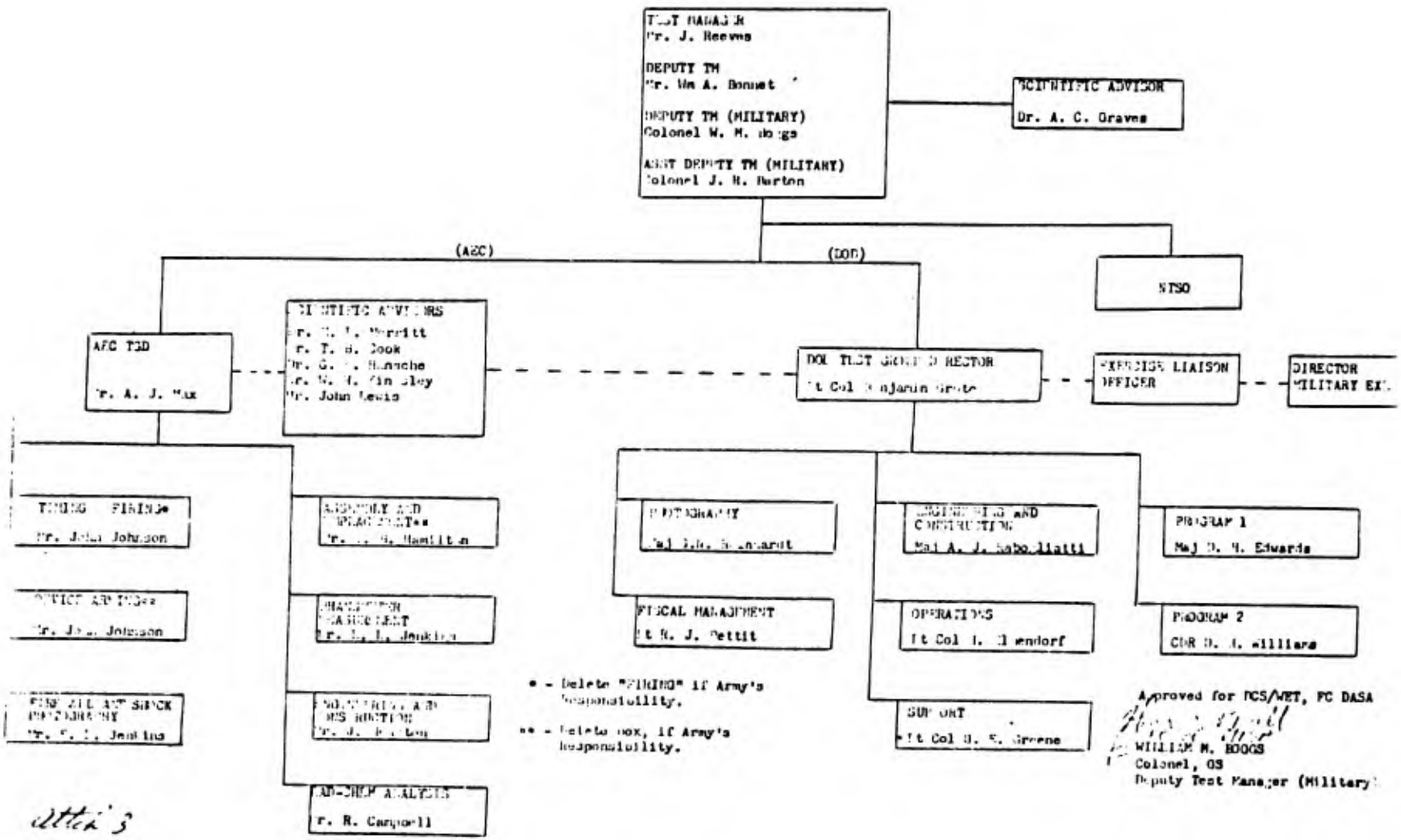
Approved for NCS/NET, PC DASA

WILLIAM H. HOKOB
Colonel, GS
Military Deputy Task Manager, MTSO

LITTLE [illegible] I

TEST ORGANIZATION

18 June 1962



* - Delete "FIRING" if Army's responsibility.

** - Delete box, if Army's responsibility.

Approved for DCS/WET, DC DASA

WILLIAM M. BOGGS
Colonel, GS
Deputy Test Manager (Military)

Attch's

CONSTRUCTION REQUIREMENTS FOR LITTLE FELLER I & II

Project 1.1 Blast Measurement - Project Agency BRL

LF I & II - 36 electronic and self-recording dynamic pressure and surface level overpressure gages. Q mounts to be moved from Smoky Area. 85' of 8' deep trench, 1350 feet of 4' deep trench. Buried metal transport-ainer at 1450' for recording shelter. Battery power installation, generator service (10KW, 220V), timing signals to all stations, pre-shot survey is required.

Project 1.3 Dynamic Pressure Effects - Project Agency BRL

LF I & II - Two 11' x 15' x 3' concrete pads with mount assemblies to support metal spheres and cubes. Two associated camera bunkers. Two buried jeeps. Five tanks, to be moved from Area 5. Timing signals required to camera bunkers. Pre-shot survey required.

Project 1.5 Debris Throwout - Project Agency ERDL

LF II - 565 items, painting and/or marking items. Items such as steel cylinders, cubes, plates, wooden blocks, boards, bricks, and 8 fabricated trees. Pre-shot and post-shot survey required.

Project 1.9 Dimensions - Project Agency WES

LF II - Pre-shot survey of drill holes. Labor, equipment, materials to backfill sand columns.

Project 2.3 & 2.4 Neutron and Gamma Measurements - Project Agency NDL

LF II - Three 3/4" diameter steel cables 1000 yards long. 26 surveyed stations along cables. LOS required at each stations R. P. to be provided by use of saw horse where required. Approximately 300 sandbags required. Cables will be pulled out 1000 yards. Grader cleared path 20 yards wide where terrain warrants No timing signal requirements.

Project 2.8 Radiological Survey - Project Agency NDL

LF I & II - No construction required.

Project 2.16 Residual Radiation - Project Agency ERDL

Atch #4

LF II - Unimproved dirt road required into R.P. from manned station at approximately 5000'. Line-of-sight control for remote control D-7 tractor required from 2000' station R.P. Turn around required at 2000' station for 5 ton tractor w/25 ton low-bed trailer.

Project 2.17 Transient Radiation Effects on Electronics - Project Agency Northrop Ventura

LF II - 4 pads required (two at 370', one at 800' and one at 1485'). Pads are 6' x 12' x 1' with 4 instrument wells extending 5' into the ground. LOS required from each pad to R.P. Self-contained instrumentation. No timing siganl requirements.

Project 2.19 Induced Activity - Project Agency NRDL

LF I - No construction. Survey only required.

Project 2.20 Gamma Transitory Dose - Project Agency NDL

LF I & II - 24 foxholes, 2' x 6' x 4' deep, required. 6 required on each of 4 bearings. Horizontal and vertical surveys required. Approximately 500 sandbags required each event. Timing signals required to each foxhole.